

Surface Properties of Semi-conductors

SOV/139-58-4-13/30

of AlSb, InSb and Ge. The results are summarised thus:

Etching eliminates the broken-up fine-grain surface layer and thereby reduces the concentration of surface acceptors. The surface properties of type $A_{III}B_V$ compounds show considerable analogy with those of germanium. A number of phenomena related to properties of thin, polycrystalline layers of the compounds $A_{III}B_V$, changes of the sign of the conductivity in the case of refining the n-type of material, the influence of the transverse electrostatic field, and the change in the output work can be explained by the presence of surface acceptor levels. There are 5 figures, 1 table and 11 references, 8 of which are Soviet, 3 English.

ASSOCIATION: Sibirskiy fiziko-tekhnicheskii institut pri Tomskom gosuniversitete imeni V.V.Kuybysheva (Siberian Physico-engineering Institute at Tomsk State University)

SUBMITTED: February 24, 1958

Card 2/2

SYNOROV, V.F., kand. fiz.-mat. nauk.; LOBASHEVSKIY, L.V., inzh.

"Slide contact" in the Great Soviet Encyclopedia. Vest.elektroprom.
29 no.10:72-74 0 '58. (MIRA 11:11)
(Electric contactors) (Encyclopedias and dictionaries)

Synorov V.F.
AUTHOR:

Synorov, V. F.

20-3-18/59

TITLE:

The Influence of the Surface on the Sign of the Conduction in AlSb and InSb (Vliyaniye poverkhnosti na znak provodimosti AlSb i InSb)

PERIODICAL:

Doklady AN SSSR, 1958, Vol. 118, Nr 3, pp. 483-484 (USSR)

ABSTRACT:

First reference is made to previous works, dealing with the same subject. This work investigates the dependence of the sign of the conduction of AlSb and InSb on the dimensions of the grain. As original material AlSb- and GaSb-preparations of the n-type were used, which were obtained by the method of alloying. The author produced layers of AlSb, In Sb, and GaSb with hole conductivity by vaporisation of the named finished compounds in vacuo. The preparations obtained by the method of alloying were crushed mechanically to a certain degree of smallness. The average dimensions of the grain were controlled by a microscope. In the various states of the grinding the sign of the thermoelectromotive force was ascertained by the compensation method. For this purpose the powder was fixed between two copper or nickel-plated

Card 1/3

The Influence of the Surface on the Sign of the Conduction
In AlSb and InSb

20-3-18/59

electrodes, between which a constant temperature difference of 80 to 100° was kept. In case of these measurements the total thermoelectromotive force, which is determined by the average dimensions of the grain in the powder, is obtained. In case of further refinement of the grain the thermoelectromotive force decreases. At grain dimensions of 2 to 3 μ it became very low; on occasion of further refinement of the grain it changed its sign and increased again. A storage of the powder over long periods and a heating in vacuo up to 200 to 300°C did not change the sign of the charge. The thermoelectromotive force was measured in that case directly in a vacuum device. For the comparison measurements were made also at pressed test pieces. The electromotive force of these pressed test pieces was somewhat higher because of the better contact between the grains. To control the method and for a comparison all the measurements were performed also with a preparation of n-germanium. The results obtained here show the following: The development of the surface of the test pieces of the AlSb and of the InSb leads to the appearance of a p-conduction. This also corresponds with the works by the author

Card 2/3

9,4170 (1145, 1482)
18.8100 1145, 1160, 1418 4016

29760
S/194/61/000/006/037/077
D201/D302

AUTHOR: Synorov, V.F.

TITLE: The effect of the surface condition on the electric properties of $Al_{III}B_V$ compounds

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 6, 1961, 6, abstract 6 D31 (V sb. Vopr. metal-lurgii i fiz. poluprovodnikov, M., AN SSSR, 1959, 120-126)

TEXT: The effect has been investigated of dimensions of crystal grain on the type of conductivity of specimens together with the effect of a transverse el. field on the electric conductivity as depending on the thickness of AlSb, InSb and Ge monocrystals. The dependence is given of the thermal emf of the powder made from the above compounds on the average grain dimensions. It is shown that the smaller the grains, the smaller the thermal emf; its sign changes when the dimensions reach 1-2 microns. With a further de-

Card 1/2

The effect of the surface condition... S/194/61/000/006/037/077
D20²⁹⁷⁶⁰, D302

crease of grain dimension, the emf increases in magnitude. The evidence obtained, confirmed by the results of measurements with compressed specimens, shows the preponderance of surface over volume properties of AlSb and InSb with strong surface development. The changes in the resistance under the influence of external fields have been investigated. The relative change in the resistance was about 10^{-3} . This shows a strong screening of the external field by the surface charge due to the existing surface levels. The strongest screening from the external field was observed in air, which is explained by the ionization of adsorbed atoms. The increase in the specimen thickness leads to a more pronounced effect of the field owing to a negligible penetration of it into the semiconductor. 20 references. [Abstracter's note: Complete translation.]

X

Card 2/2

81347

S/181/60/002/03/01/028
PO06/B017

24.7700
AUTHORS:

Presnov, V. A., Synorov, V. F.

TITLE:

Investigation of the Surface Electrical Conductivity of Germanium Single Crystals

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 3, pp. 381-387

TEXT: The authors investigated the influences exercised by various kinds of processing and coating on the conductivity of samples of germanium single crystals. Here, they report on the theory, experiments, and results obtained from the investigations of these effects. In the first chapter of this paper, some conceptions on the surface state of a semiconductor are discussed. The nature of the electron surface states in a semiconductor may vary: 1) Tamm levels (I. Ye. Tamm, Ref. 6), which always occur in a bounded crystal; 2) levels occurring due to increased concentration of impurity ions in the layer near the surface; and 3) levels produced by atoms which are bound to the semiconductor atoms by covalent forces. Further, the conclusions drawn on the surface states by

Card 1/4

Investigation of the Surface Electrical
Conductivity of Germanium Single Crystals

81347

S/181/60/002/03/01/028
B006/B017

R. L. Myuller et al. from results of etching experiments are discussed, and two cases of influence exercised by the surrounding medium on the surface are discussed. The authors themselves conducted their investigations in n-type and p-type germanium single crystals: To increase the surface effects, very thin samples were used (0.15 - 0.2 mm). These platelets had a size of 5 . 3 mm with two contacts each. An alloy consisting of tin with 5-10% antimony served as "solder". Before the measurement was made, the samples were etched for 5 - 10 minutes in boiling hydrogen peroxide and then washed in distilled water. The further preparation for the measurement is described. The current passing through the samples was of the order of some milliamperes. Resistance was measured by means of a ППТБ-1 (PPTV-1) potentiometer according to the compensation method, a mirror galvanometer serving as zero instrument. The temperature dependence of the resistance was investigated (see Fig. 2), after which the samples were taken out of the ampoules, processed or coated with lacquer, and the measurements were then repeated. The results of measurement of the temperature course of resistance on etched and processed samples (ground with sand or methyl alcohol, or treated with

Card 2/4

Investigation of the Surface Electrical
Conductivity of Germanium Single Crystals

81347

S/181/60/002/03/01/028
B006/B017

paraffin), or on samples coated with lacquer are shown in a Table. Figs. 3 and 4 show the resistances of samples coated with lacquer as a function of temperature. n-type germanium tends to reduce the relative resistivity with increasing temperature, whereas p-type germanium shows a certain increase (Fig. 5). As may be seen from Fig. 3, the electrical resistance of the layer near the surface decreases in n-type germanium for samples with lacquer coatings, whereas it increases in p-type germanium. The authors try to explain some further results of the various processing methods. Hence, e.g., the increase in the resistivity of n-type germanium treated with CH_3OH is explained by the interaction between the OH-group and the surface dipoles as well as by the resulting reduction of the electron concentration in the layer near the surface. The decrease of the resistivity of both germanium types after a treatment with finest sand is explained by the occurrence of surface conductivity. Student E. A. Anpilogova took part in the experiments. There are 5 figures, 1 table, and 9 references: 6 Soviet, 2 US, and 1 English.

Card 3/4

Investigation of the Surface Electrical
Conductivity of Germanium Single Crystals

81347

S/181/60/002/03/01/028
B006/B017

ASSOCIATION: Sibirskiy fiziko-tekhnicheskii institut pri Tomskom
universitete im. V. V. Kuybysheva (Siberian Institute of
Physics and Technology at Tomsk University imeni V. V.
Kuybyshev)

SUBMITTED: June 23, 1959

Card 4/4

9.4300 (3203, 3005, 1137)
26.2532

21513
S/139/61/000/002/008/018
E032/E414

AUTHORS: Krivov, M.A., Malisova, Ye.V., Presnov, V.A. and
Synorov, V.F.

TITLE: A Study of Some Physical Properties of Polycrystalline
GaAs

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika,
1961, No.2, pp.66-70

TEXT: This paper was first reported at the Third Conference of
Schools of Higher Education on Semiconductors and Dielectrics,
Leningrad, 1960.

The resistivity, thermoelectric power and the Hall coefficient of
polycrystalline specimens of gallium arsenide were measured.
The original material was synthesized directly from arsenic and
gallium and was zone refined six times (this will be described in a
separate paper). The final specimens were rectangular in form
and their dimensions were $2 \times 2 \times 7 \text{ mm}^3$. The resistivity and the
Hall coefficient were measured with the aid of ohmic tin contacts
fused into the specimens in a vacuum at temperatures of the order
of 600 to 700°C. Before measurements were begun, the specimens

Card 1/6

21513

A Study of Some Physical ...

S/139/61/000/002/008/018
E032/E414

were immersed in a solution containing 20 ml of NaOH and 4 ml of 30% H₂O₂ (G.A.Averkiyeva, O.V.Yemel'yanenko, Ref.1) After this treatment they were washed in boiling distilled water. Fig.1 shows the temperature dependence of the electrical conductivity and carrier concentration calculated from the Hall measurements under the assumption that the hole concentration was negligible. It is estimated from the slope of the curve representing concentration as a function of temperature that the activation energy of the donor impurities was 0.12 ev. Fig.2 shows the thermoelectric power as a function of temperature for two gallium arsenide specimens at different average temperatures. Using the Pisarenko formula (Ref.2) the magnitude of the effective mass of the carriers was estimated to be of the order of 0.27 m₀. The experimentally determined temperature dependence of the concentration was compared with its theoretical value computed from the formula

Card 2/6

A Study of Some Physical ...

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E032/E414

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$$n = \frac{K_A + N_A}{2} \left\{ \left[1 + \frac{4K_A(N_A - N_D)}{(K_A + N_A)^2} \right]^{1/2} - 1 \right\};$$

$$K_A = (2\pi m_e^* k T / h^2)^{3/2} e^{-\Delta\epsilon_A / kT},$$

where N_D and N_A are the donor and acceptor impurity concentrations, m_e^* is the effective electron mass, and $\Delta\epsilon_A$ is the donor activation energy. It was found that $N_D = 1.18 \times 10^{18} \text{ cm}^{-3}$ and $N_A = 1.10 \times 10^{18} \text{ cm}^{-3}$. In addition, the contact potential difference of gallium arsenide specimens relative to a standard platinum electrode was measured. The measurements were carried out on polished and etched specimens in air and in vacuum at various temperatures in the range 20 to 85°C. Fig.4 shows the temperature dependence of the contact potential difference of germanium and gallium arsenide in air. The continuous and dashed curves refer to etched and polished specimens respectively. Fig.5 shows the contact potential difference as a function of air pressure after etching. Fig.6 shows the variation

Card 3/6

21513

A Study of Some Physical ...

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EO32/E414

in the contact potential difference on heating in vacuum. A quantitative analysis of these results is not given since the specimens were polycrystalline and the results are therefore said to be "not entirely reliable". The general conclusion is that changes in the surface properties of gallium arsenide are associated with the properties of surface compounds formed during the etching process and subsequent adsorption of components from the surrounding medium. Students I.A.Vinitskaya and L.Ye.Smirnova took part in the measurements. Acknowledgments are expressed to the Senior Scientist of SFTI, Candidate of Physical Mathematical Sciences A.P.Izergin and Engineer V.A.Zgayevskiy of the Technical Division for taking part in discussions of the results. There are 6 figures and 6 references: 3 Soviet and 3 non-Soviet.

ASSOCIATION: Sibirskiy fiziko-tekhnicheskii institut pri Tomskom gosuniversitete imeni V.V.Kuybysheva.
(Siberian Physicotechnical Institute at the Tomsk State University imeni V.V.Kuybyshev)

SUBMITTED: October 17, 1960
Card 4/6

SYNOROV, V.F.

Mean temperature of brushes of electric machines. Izv.vys.ucheb.
zav.; fiz. no.3:71-75 '61. (MIRA 14:8)

1. Sibirskiy fiziko-tekhnicheskii institut pri Tomskom gosuniversitete
im. V.V.Kuybysheva.
(Brushes, Electric)

34191

S/139/61/000/006/010/023

E039/E414

9.4310 (1003, 1139, 1150)

AUTHORS: Synorov, V.F., Davydova, T.G.

TITLE: On the question of investigating certain organic coatings for protecting the surface of semiconductor devices

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Fizika.
no.6, 1961, 74-80

TEXT: Loss of stability and reliability in semiconductor diodes and triodes appears to be mainly due to surface processes. The authors have, therefore, examined the effect of the following coatings on the parameters of semiconductor devices:
a standard compound with a base of butylmethacrylate - MBK-3 (MBK-3);
17 parts by weight of epoxy-resin Э-40 (E-40) and 2 parts 50% solution hexamethylenediamine in alcohol;
17 parts by weight of epoxy-resin ЭД-6 (ED-6) and 2 parts 50% solution of hexamethylenediamine in dibutylphthalate;
17 parts by weight epoxy-resin E-40 and 2 parts 50% solution hexamethylenediamine in dibutylphthalate;
17 parts by weight epoxy-resin E-40 and 1.6 parts

Card 1/3

34194

S/139/61/000/006/010/023
E039/E414

On the question of ...

50% solution hexamethylenediamine in dibutylphthalate. The hexamethylenediamine is a hardener used at room temperature and the dibutylphthalate is a plasticizer for reducing the brittleness of the coatings. The germanium triodes were first etched in a boiling solution of 30% perhydrol, rinsed for 1 to 2 min in boiling distilled water and then dried for 3 hours at 120°C. Before applying the coatings a series of control measurements were made of the amplification coefficient and the reverse collector current. The samples were then coated, dried for 8 hours at a temperature of 70 to 80°C and the measurements repeated. The results obtained are given in figures and tables showing the most probable values of the amplification coefficient and the reverse collector current. The experiments indicate that quite different (chemically) coatings give rise to similar changes in the parameters of the germanium triodes. To a first approximation the mechanism of these effects can be explained by changes in the surface potential associated with the adsorption of polar molecules of the coating by the germanium surface. There are 5 figures, 1 table and 6 references. 5 Soviet and 11 non-Soviet-bloc. The four most recent references to English Card 2/3

3491

S/139/61/000/006/010/023
E039/E414

On the question of ...

language publications read as follows: Ref.3: H. Statz, de Mars,
L. Davias, A. Adams. Phys. Rev., v.101, no.4, 1956, 1272;
Ref.4: W.T.Eriksen, H. Statz, G.A. de Mars. J. Appl. Phys., v.20,
no.1, 1957, 138; Ref.5: J.T.Wallmark. RCA, v.18, 1957, 255;
Ref.6: J.T.Wallmark, R.R.Johnson, RCA Rev. v.18, no.4, 1957, 512.

ASSOCIATION: Sibirskiy fiziko-tekhnicheskii institut pri Tomskom
gosuniversitete imeni V.V.Kuybysheva
(The Siberian Physicotechnical Institute of Tomsk
University imeni V.V.Kuybyshev)

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SUBMITTED: October 19, 1960

Card 3/3

43113

S/181/62/004/011/C08/049
B102/B104

AUTHOR: Synorov, V. F.

TITLE: The influence of a chemical treatment of germanium surfaces
on the electrical properties and on the stability

PERIODICAL: Fizika tverdogo tela, v. 4, no. 11, 1962, 3065 - 3074

TEXT: Ground n-type Ge surfaces were etched with various agents and the resulting changes in electrical properties such as surface recombination rates, contact potential differences (Ge-Pt), surface conductivity, and field effects were investigated and compared. The following etching agents were used: a) 30% H_2O_2 solution, b) CP-4 (SR-4) (5 parts nitric acid, 5 parts hydrofluoric acid, 3 parts acetic acid), c) WAg (4 cm^3 HF, 4 cm^3 H_2O , 2 cm^3 HNO_3 , 200 mg $AgNO_3$), and d) CP-8 (SR-8) (1 part hydrofluoric acid and 2 parts nitric acid). Some of the etched samples were washed, dried and immediately investigated; some were exposed to air, nitrogen or water vapor before the measurements were taken; some were heated (up to 650°C). Some

Card 1/4

The influence of a ...

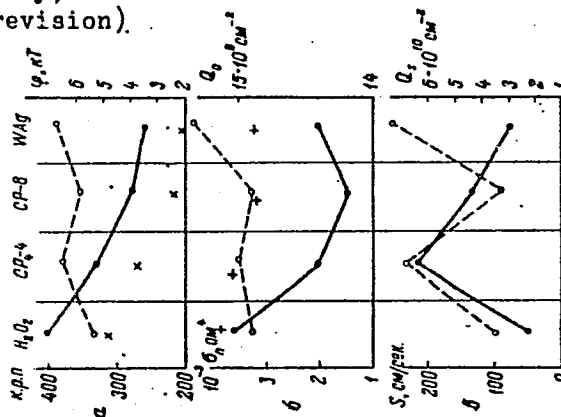
S/181/62/004/011/008/049
B102/B104

from SR-4 to SR-8. There are 7 figures and 2 tables.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: March 3, 1962 (initially)
June 4, 1962 (after revision).

Fig. 3. a) Ge-Pt terminal potential difference (solid line), zone curvature (dashed line); б) surface conductivity σ_n (solid line), volume charge density (dashed line); в) surface recombination rate S (solid line) surface charge (dashed line).



Card 3/4

L 18997-63

EWP(q)/EWT(m)/BDS

AFFTC/ASD

JG/JD

ACCESSION NR: AT3002457

S/2935/62/000/000/0221/0228

AUTHOR: Syhorov, V. F.; D'yakov, V. V.; Bobrova, L. I.

TITLE: Effect of chemical treatment on the surface characteristics of germanium and on the parameters of semiconductor devices [Conference on Surface Properties of Semiconductors, Institute of Electrochemistry, AN SSSR, Moscow, 5-6 June, 1961]

SOURCE: Poverkhnostnyye svoystva poluprovodnikov. Moscow, Izd-vo AN SSSR, 1962, 221-228

TOPIC TAGS: chemical treatment, germanium, semiconductor, surface characteristics, semiconductor device

ABSTRACT: An experimental development is described of a stabilizing, protective, "passive" coating on Ge surface. The sulfidizing bath comprised: (a) low-melt chemically neutral salts; (b) active sulfides whose atoms have reduction properties; (c) a catalyst salt. n-Ge specimens of 2-ohms.cm resistivity were sulfidized for 20-30 min at 430-450C. The 2-4-micron coating was found resistant to HCl and HF, to vacuum heating and to 450C heating in N atmosphere; its moisture absorption was found to be very low. Measured by the photomagnetic method, rate of surface recombination of sulfidized Ge was 44-64 cm/sec. Alloying In through the sulfidized

ASSN: Tomsk State University.

Card 1 1/2

L 18997-63

ACCESSION NR: AT3002457

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surface at 550C resulted in a few batches of p-n-p Ge transistors whose characteristics were tested (curves presented). Authors' conclusions: (1) Principal possibility has been proved of obtaining a stable compound on the Ge surface by means of sulfidizing; (2) The resulting surface has better mechanical characteristics and is less liable to hydration than the untreated Ge surface; (3) Electrical characteristics of the surface are stable; (4) Ohmic contact is possible by fusing-in tin through the sulfide coating; (5) Possibility has been proved of obtaining p-n junctions by alloying In through the sulfide coating; (6) Parameters of test transistors have been stable to the effects of atmosphere and water vapor at room and higher temperatures. Orig. art. has: 7 figures and 2 tables.

ASSOCIATION: Tomskiy gosudarstvennyy universitet im V. V. Kuyby*sheva
(Tomsk State University)

SUBMITTED: 00

DATE ACQ: 15May63

ENCL: 00

SUB CODE: PH

NO REF SOV: 000

OTHER: 007

Card 2/2

ACCESSION NR: AP4025083

S/0139/63/000/006/0028/0033

AUTHOR: Sy*norov, V. F.

TITLE: Experimental verification of alloyed germanium triode parameters as a function of surface recombination rate

SOURCE: IVUZ. Fizika, no. 6, 1963, 28-33

TOPIC TAGS: bare triode, junction triode, surface recombination, p-n transition, Zener effect

ABSTRACT: An experiment has been carried out with bare triodes of the type P-5 to verify a formula derived by B. Ya. Moyzhes (ZhTF, 28, 2402, 1958) for calculating the operating parameters of junction triodes, including volume and surface recombination and the actual geometry of the triode. Two independent methods of measurements were used. The first was by etching the indium, alloyed with germanium, with hydrochloric acid and then measuring the depth of germanium fuse on the emitter and collector with a microscope. In the second method the fuse depth was determined by glass etching and using a continuous probe determination of electron and hole conduction region boundaries from oscillograph volt-ampere characteristics. The amplification coefficient was plotted as a function of surface recombination rate

Card 1/2

KUCHUMOV, A.P., kand.tekhn.nauk, dotsent; SYNOROV, V.F., kand.tekhn.nauk,
dotsent

Physical processes in the brush contact. Trudy OMIIT 40:189-203
'63. (MIRA 18:8)

L 2111-65 EWG(j)/EWT(m)/EPF(c)/EPR/EWP(q)/EWP(b) Pr-4/Ps-4 ASD(a)-5/
RAEM(t) JD
ACCESSION NR: AP4043866 S/0139/64/000/004/0061/0067
AUTHORS: Sy*norov, V. F.; Tolsty*kh, B. L.; Vasil'yeva, V. V. 28
TITLE: Investigation of the possibility of protecting the surface
of diffuse silicon electron-hole junctions by means of an oxide
film 27
SOURCE: IVUZ. Fizika, no. 4, 1964, 61-67
TOPIC TAGS: silicon rectifier, diffusion pn junction, doping, di-
electric breakdown, surface layer, oxide
ABSTRACT: The purpose of the work was to investigate the possibility
of simultaneous utilization of a thick surface layer of silicon
oxide, both as a mask in selective diffusion and as an additional sur-
face protection film. To this end, the authors investigated the
electric properties of diffusion silicon pn junctions obtained by
diffusion of boron in silicon doped with phosphorus. The thick sur-
Card 1/3

L 2111-65

ACCESSION NR: AP4043866

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face oxide film (1--2 microns) was prepared by oxidation in water vapor and by oxidation in an atmosphere of moist nitrogen. The sample production procedure is described. The depth of the junction was measured by taking an oblique cut through the junction and measuring the sign of the rectification with a pointed cold probe. The usual depth for boron was 8--10 microns. The protective film was found to reduce the breakdown voltage of the junction, which was restored to its initial value after removing the protective film (by etching). However, the protective film did make the junction stable against tropical moisture conditions. The reason for the reduced breakdown strength in the protected junctions is analyzed from the point of view of redistribution of the doping impurity during the course of oxidation, the one-dimensional surface-breakdown theory, and the Shockley theory. All indicate that one of the probable mechanisms for the reduction in the breakdown voltage is the increase in the impurity concentration on the interface between the silicon and the silicon dioxide. Orig. art. has: 6 figures and 1

Card 2/3

L 1304-66 EWT(m)/EPF(c)/EWP(t)/EWP(b) IJP(c) JD
 ACCESSION NR: AP5012544

UR/0181/65/007/005/1375/1377
 46
 45
 B

AUTHOR: Synorov, V. F.; Bulgakov, S. S.; Stepanov, V. V.

TITLE: Effect of low-energy nitrogen ions on the surface of germanium

SOURCE: Fizika tverdogo tela, v. 7, no. 5, 1965, 1375-1377

TOPIC TAGS: surface ionization, conductivity, pn junction, volt ampere characteristic, ionizing radiation

ABSTRACT: The authors investigate the changes in the properties of germanium when its surface interacts with nitrogen ions having energies 1--3 keV. Germanium plates measuring 12 x 5 x 0.3 mm and having specific resistivity 10 ohm-cm, the surfaces of which were etched after polishing, were used. The samples were bombarded in apparatus consisting of a high-frequency ion source, an acceleration tube, and a current-transmitting sample-clamping system. The working gas was commercial nitrogen from which the impurities were first removed. The conductivity of the germanium was measured with a double bridge directly in the irradiation chamber. In some experiments, a non-bombarded pn junction was investigated. The volt-ampere characteristic were plotted in the usual fashion. The effect of the bombardment was judged from the change in the conductivity in the irradiated germanium with time, and also by a more accurate method of measuring the change in the inverse current

Card 1/2

L 1304-66

ACCESSION NR: AP5012544

through the bombarded pn junction. Plots were obtained of the relaxation of the conductivity after bombardment, of the volt-ampere characteristics of the pn junction, and of the time dependence of the inverse pn junction current. The measured results agreed well with the published data. Orig. art. has: 3 figures.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: 09Nov64

ENCL: 00

SUB CODE: SS

NR REF SOV: 011

OTHER: 004

mlr
Card 2/2

L 12103-66 EWT(1)/EWI(m)/T/EWP(t)/EWP(b) IJP(c) JD/GG
ACC NR: AP6000535 SOURCE CODE: UR/0075/35/010/006/0918/0920

AUTHOR: Synorov, V.F.; Kuznetsova, Ye.A.

ORG: Voronezh State University (Voronezhskiy gosudarstvennyy un-
rsitet)

TITLE: The structure of silicon and germanium sulfide surface layers

SOURCE: Kristallografiya, v. 10, no. 6, 1965, 918-920

TOPIC TAGS: silicon single crystal, silicon compound, germanium single crystal,
germanium compound, protective coating

ABSTRACT: Numerous attempts were made recently to produce oxygen-free surface compounds on silicon and germanium crystals. In the first part of the present paper the authors investigated, using electron diffraction analysis, the structure (in particular, the phase composition) of the sulfide layer created on the surface of a Si monocrystal processed in a special sulfidation tank. The experimental results obtained for the lattice plane distances are in good agreement with the theoretical data for SiS. The second part of the paper is devoted to the study of the structure of germanium sulfide layers produced on the surface of germanium monocrystals during their reaction with sulfur vapors. The Debye diagram utilized the Cu K_α line. The comparison of the experimental and theoretical values for various lattice plane distances showed that the stable chemical compound formed is indeed crystalline GeS. Differences in color of such layers are due to differences in thickness only. Orig. art. has: 1 figure and 3 tables.

UDC: 548.736

Card 1/2

L 12103-66

ACC NR: AP6000535

SUB CODE: 11,20 / SUBM DATE: 14May64 / ORIG REF: 004 / OTH REF: 002

Card

2/2

L 15770-66 EWT(m)/T/EWP(t)/EWP(b) IJP(c) JD
ACC NRT AP5028286

SOURCE CODE: UR/0020/65/165/002/0391/0394

AUTHOR: Synorov, V. F.

ORG: Voronezh State University (Voronezhskiy gosudarstvennyy universitet)

TITLE: Use of surfaces of inorganic germanium compounds for increasing the stability of germanium single crystals

SOURCE: AN SSSR. Doklady, v. 165, no. 2, 1965, 391-394

TOPIC TAGS: germanium compound, single crystal, sulfide, nitride, radiography, germanium single crystal, x ray analysis

ABSTRACT: Germanium oxides, always present on the surface of germanium, do not secure the stability of electrophysical parameters of germanium. A study was made of the reaction of single-crystal germanium with sulfur and ammonia to determine the effect of sulfides and nitrides on the surface properties of germanium. A uniform monosulfide gold-colored layer, $\sim 1\mu$ thick, was formed on the germanium crystal after treatment for 5 minutes in tubular furnace by sulfur vapors at 440C and 17 mm Hg pressure of the sulfur vapors. The structural and chemical X-ray

1/3

UDC: 621.315.592:537

L 15770-66

ACC NR: AP5028286

analyses showed that the film consisted of GeS of orthorhombic structure ($a=4.299 \text{ \AA}$, $b=10.44 \text{ \AA}$, $c=3.647 \text{ \AA}$), with a resistivity $\geq 4 \cdot 10^5 \text{ ohm cm}$, and a breakdown voltage of 10^4 v/cm . The surface layer dissolved during prolonged storage in water at room temperature, during boiling in water, and in weak alkaline solutions. The nitride layer (1μ) produced on germanium crystals at 800°C and with 780 mm Hg pressure of the ammonia vapor did not dissolve in water, acids, alkalis and other solvents even during boiling. A reduction of nitride by hydrogen occurred at temperatures $> 600^\circ \text{C}$. The nitride layer consisted of Ge_3N_4 , had a hexagonal structure ($a=13.3 \text{ \AA}$, $c=9.4 \text{ \AA}$, $\alpha=8.53^\circ$, $\beta=107^\circ 45'$) in the lower dense part, and an orthorhombic one ($\Delta U - A_s - B_s \log P$) in the upper friable part; the resistivity was $> 10^8 \text{ ohm cm}$ and the breakdown voltage amounted to 10^2 v/an . The contact potential difference (ΔU) was measured by the condenser method and the dependence of ΔU on water-vapor pressure was determined for sulfidized and nitrided samples. For the water-vapor pressure range of 10^{-4} – 10^{-1} mm Hg , it was expressed by the equation $\Delta U - A_s - B_s \log P$, where P is the water-vapor pressure in mm Hg , A_s and B_s are the constants equal to 0.16 and 0.05 for sulfidized, and 0.12 and 0.01 for nitrided samples, respectively. A study of the effect of the pressure of oxygen on ΔU showed that the adsorption of oxygen on sulfidized and nitrided surfaces of germanium increased the work function by 0.05 and 0.035 ev , respectively. The long-

2/3

L 15770-66
ACC NR: AP5028286

time changes in the work function in ranges from 15 seconds to 10 minutes were characterized by the expression $\Delta\phi = A + B \log t$, where t is the time in minutes and A and B are constants equal to 0.05 and 0.023 ev, respectively. The experiment proved the advantages of replacing the oxides on the surfaces of single crystals of germanium by more stable compounds. Orig. art. has: 3 figures.

SUB CODE: 20/ SUBM DATE: 09Mar65/ ORIG REF: 008/ OTH REF: 006

ACC NR: AP7001940

SOURCE CODE: UR/0120/66/000/006/0061/0063

AUTHOR: Kryachko, V. V.; Synorov, V. F.

ORG: Voronezh State University (Voronezhskiy gosudarstvennyy universitet)

TITLE: Beta-spectrograph for irradiation of semiconductors in a range from 0.1 to 1 kev

SOURCE: Priory i tekhnika eksperimenta, no. 6, 1966, 61-63

TOPIC TAGS: spectrographic camera, spectrographic analysis, irradiation, irradiation effect, electron bombardment

ABSTRACT:

A description is given of a beta-spectrograph designed for use in investigating the effect produced by electrons on semiconductors in the range from 0.1 to 1 kev. This spectrograph makes it possible to maintain an ultra-constant target temperature and to easily replace the target and the cathode. The design should satisfy the following conditions: 1) light emitted by the cathode should not strike the target; 2) relative error in the determination of the electron energy should not exceed 1-2%; and 3) the target should have maximum protection against impurities resulting from dissociation of the cathode and against the condensation of the vapors of organic substances. The resolving power of the spectrograph was $D^{-1} = 0.9\%$. Maximum density

Card 1/2

UDC: 539.293:537.533.7

ACC NR: AP7001940

of the beam current during operation with a tungsten cathode was approximately 10^{-6} amp/cm². Pulse rise time during pulsed irradiation was 0.2 μ sec. The spectrograph was used to study changes of the surface energy states of germanium acted upon by electrons with an energy of 100—400 ev. The electrons generate a positive charge in the natural oxide film, coating the germanium surface. As a result the surface conductivity shifts from p- to n-type. The shape of the curve representing the dependence of the surface recombination S on the surface potential ϕ_s for germanium processed in H₂O₂ changes considerably during electron irradiation. In addition to the fundamental stable maximum S, a second induced maximum at $\phi_s < 0$ with a large amplitude value S appears as a result of irradiation. The amplitude of the induced maximum diminishes spontaneously to the initial level 10 to 15 min after irradiation. It is shown that the nature of the induced maximum S is associated with the recombination centers, whose effectiveness depends on the positive charge appearing in the oxide film. Orig. art. has: 1 formula and 5 figures.

SUB CODE: 20/ SUBM DATE: 20Nov65/ ORIG REF: 005 / ATD PRESS: 5111

Card 2/2

SYNOVETS, A.S., dotsent

Change in the protein fractions of the blood in acute intestinal obstruction. Vrach.delo no.12:52-54 D '62. (MIRA 15:12)

1. Kafedra fakul'tetskoy khirurgii (zav. - prof. M.P.Sokolovskiy)
Odesskogo meditsinskogo instituta.
(BLOOD PROTEINS) (INTESTINES—OBSTRUCTIONS)

SYNOVETS, A.S.; BUTENKO, G.M.

State of the hematoencephalic barrier in acute intestinal obstruction. Vrach. delo no.11:56-59 N'63 (MIRA 16:12)

1. Kafedra fakul'tetskoy khirurgii (zav. - prof. M.P.Sokolovskiy), kafedra patologicheskoy anatomii (zav. - prof. Ye.A. Uspenskiy) i kafedra patologicheskoy fiziologii (zav. - dotsent S.M.Mints) lechebnogo fakul'teta Odesskogo meditsinskogo instituta.

SYNOVETS, A. S.; BUTENKO, G. M.

Distribution of radioactive chlorine in the organism of a rat
with acute intestinal obstruction. Dokl. AN SSSR 156 no. 1:
228-229 My '64. (MIRA 17:5)

1. Odesskiy gosudarstvennyy meditsinskiy institut im. N. I.
Pirogova. Predstavleno akademikom L. S. Shtern.

SYNOWIEC, Adam

Auxiliary equipment for limnological research in winter; ice drills.
Przegl geogr 30 no.3:485-488 '58. (EEAI 9:8)
(Limnology) (Ice)

SYNOWIEC, Aleksander

Standardization in the service of technical progress. Wiadom
gorn 11 no. 9:311-313 S '60.

5

15

Action of Inhibitors in the Acid Pickling of Steel. Part II. M. Smialowski, J. Synowicz, and M. Szota. (Prace Badawcze Głównego Instytutu Metalurgii i Odlewnictwa, 1950, No. 1, pp. 31-35). (In Polish). No satisfactory results were obtained when various structural steels were pickled in sulphuric acid at 40°C. using dibenzylsulphide as an inhibitor. With mixed powders of electrolytic iron, nickel, and copper the inhibiting efficiency of dibenzylsulphide as an inhibitor. With mixed powders of electrolytic iron, nickel, and copper the inhibiting efficiency of dibenzylsulphide is greater than with iron powder alone or with iron and graphite. The adsorption of aniline and diphenylamine by electrolytic iron powder was tested by experiments; they had very feeble inhibiting action on steels in sulphuric acid.—K. A. R.

Enamelled chemical apparatus. J. Sennacher. *Practical Chem.* 9, 125 30 (1888) (English summary). The composition of different enamels and their properties, the methods of enamelling and the examination of the quality of enamel app., and the use of enamelled app. have been described. G. A. W.

[Handwritten signature]

Distr: 4E2c(m)

Vacuum crystallization of ammonium chloride. Jerzy
Synowicz and Janina Pabis-Machet (Inst. Inorg. Chem.
Gliwice, Poland). *Przemysl Chem.* 39, No. 8, 181-7 (1960).
—The effect of several factors, such as intensity of stirring,
cooling velocity, initial concn., and presence of NaCl, on
the crystn. of NH_4Cl was investigated. A pilot 3-stage con-
tinuous vacuum crystallizer was constructed. Its produc-
tion per unit vol. was 5 times that of batch crystallizers and
amounted to 24-5 kg./cu. m. hr. B. Józefowicz

4
+ mpc(jd)

gk

SYNOWIEC, Jerzy; HAWLICZEK, Jozef

Methods of organizing the management of hydrogen chloride waste products. Przem chem 39 no.3:478-485 Ag '60.

1. Instytut Chemii Nieorganicznej, Gliwice

HAWLICZEK, Jozef; SYNOWIEC, Jerzy

Research on hydrogen chloride desorption from aqueous solutions.
Pt. 1. Chemia stosow 6 no.3:369-387 '62.

1. Instytut Chemii Nierorganicznej, Gliwice.

SYNOWIEC, Jerzy

Influence of the construction materials on the value of the specific wetting rate for horizontal tubes. *Chemia stosow* B 1 no.2:275-283 '64.

1. Institute of Chemical Engineering and Apparatus Design, Gliwice, of the Polish Academy of Sciences. Submitted April 16, 1963.

SYNOWIEC, Jerzy; BOBROWICKI, Włodzimierz

Studies on the hydrogen chloride desorption from aqueous solutions. Pt.2. *Chemia stosow* 8 no.4:383-403 '64.

1. Institute of Inorganic Chemistry, Gliwice, and Department of Inorganic Technology, Technical University, Wrocław.

SYNOWIECKI, Z.

"Crystalline procaine penicillin" p. 268 (Chemik, Vol. 6, No. 10, Oct. 1953, Katowice)

East European Vol. 3, No. 3
SO: Monthly List of Russian Accessions / Library of Congress, March 195⁴, Uncl.

SYNOWIEDZKI, A.

SYNOWIEDZKI, A.; KOJER, R.; KROWCZYNSKI, L.; WAGNER, R.; GRUBER, K.;
TYRAŁO, R.

Studies on stability of hemopoietic factors (vitamin B₁₂) in
concentrate of liver extract and in the presence of potassium
cyanide and cobalt chloride. Farm. polska 10 no.5:130-132 May '54.

1. Z Instytut Farmaceutycznego w Warszawie. Dyrektor mgr W. Gumulka.

(VITAMIN B₁₂,
stability in liver extract in presence of potassium
cyanide & cobalt chloride)

(LIVER EXTRACTS,
stability of vitamin B₁₂ in presence of potassium
cyanide & cobalt chloride)

(CYANIDES, effects,
potassium cyanide, on stability of vitamin B₁₂ in
liver extract)

(COBALT,
chloride, eff. on stability of vitamin B₁₂ in liver
extract)

SYNOWIEDSKI, Z																										10																									
CF																																																			
<p>New syntheses of caffeine and theophylline. Boguslaw Bobranski and Zdzislaw Synowiedski (Univ. Warsaw, Poland). <i>J. Am. Pharm. Assoc., Sci. Ed.</i> 37, 62-1 (1948). --From $\text{CNCH}_3\text{CO}_2\text{H}$ and urea in the presence of Ac_2O was prepd. cyanocetylurea, which was changed to 4-imino-2,6-dioxohexahydropyrimidine (I) by means of 10% NaOH. On adding NaNO_2 and 10% H_2SO_4 to I, 64% 6-iminoviolic acid (II) was obtained as red microcrystals. Reduction of II by Zn and H_2SO_4 yielded 70% 4,5-diamino-2,3-dihydropyrimidine sulfate, which with anhyd. HCO_2Na and HCO_2H yielded 90.5% 4-amino-5-formamido-2,6-dihydropyrimidine (III). Methylation of III with Me_2SO in alk. soln. produced 37.5% caffeine. Methylation with Me_2SO gave 61% 1,3-di-Me deriv. of I, which with NaNO_2 and 90% AcOH was changed to 1,3-dimethyl-4-iminoviolic acid (IV), purple crystals (84.5% yield). IV with 93% HCO_2H and Zn powder yielded 62.5% 1,3-dimethyl-4-amino-5-formamido-2,6-dioxotetrahydropyrimidine (V), which with 40% NaOH produced 80% theophylline. H. Bernard</p>																																																			
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																																																			
MATERIALS INDEX																										E-2																									
MATERIALS INDEX																										E-2																									

SYNOWIEDZKI, Z.

POL.

3317

015.779.932

Synowiedzki Z., Elsner J., Boldek Cz., Plochański T., Kotula Z., Cwał-
szyński I. Crystalline Procaine Penicillin for Intramuscular Injection
in Water Suspension.

"Krystaliczna penicylina prokainowa do zastrzyków domięśni-
owych w zawiesinie wodnej". Przemysł Chemiczny. No. 5, 1954, pp.
269-273, 7 figs., 10 tabs.

The aim of the experiments here described was to work out an eco-
nomic method of obtaining procaine penicillin from N-ethylpiperidine
salt and from potassium salt of penicillin. The course of the process is
given together with the influence of different parameters on the yield.
The properties of the procaine penicillin obtained were investigated.
The efficacy of the product was established in a number of clinical
tests. This method of manufacture was notified to industry in the
year 1953.

SYNOWIEDZKI, Zdzislaw

New penicillin preparation containing procaine salt and potassium benzyl penicillin. Polski tygod. lek. 9 no.42:1358-1359 18 Oct 54.

1. Z Zakladu Antybiotykow Instytutu Farmaceutycznego w Warszawie.
(PENICILLIN, derivatives,
potassium penicillin G with procaine penicillin)

SYNOWIEDZKI, Z.

Codification of the names of medicinal plants. Z. S.
nowiedzki, R. Kofer, L. Króczyński, P. Wagner, S.
Chabowski, R. Tyrak (Inst. Farm., Warsaw). Farm.
Polka 10, No. 5, 125-33 (1964).—Discussion. L. J. P.

SYNOWIEDZKI, ZDZISLAW

POL.

2-(Phenylbenzylaminomethyl)imidazoline hydrochloride.
Stanisław Biniński, Wanda Mioduszevska, Eugeniusz
Muszyński, and Zdzisław Synowiedzki, *Acta Polon.*
Pharm. 11, 47-50 (1954) (English summary).—HCl and
EtOH with HOCH₂CN give 94.5% HOCH₂C(OEt):NH.
HCl which with (CH₃NH)₂ yields 87.8% 2-(hydroxy-
methyl)imidazoline-HCl, m. 150-1°, converted with SOCl₂
to 79.4% 2-(chloromethyl)imidazoline-HCl, m. 205°; this,
heated 4 hrs. at 120-30° with PhNHCH₂Ph yields 72.17%
2-(phenylbenzylaminomethyl)imidazoline hydrochloride, m.
229-31° (recrystd. from H₂O, m. 233°). A scheme of the
reactions is included. 8 references. Michael Dymicky.

MS 204

SYNOWIEDSKI, Zdzisław

SYNOWIEDSKI, Zdzisław; MIODUSZEWSKI, Jan Zbigniew; SIKORSKA, Janina;
SZAFRANOWA, Halina.

Dextran as plasma substitute; investigations and method of preparation. Acta Poloniae pharm. 11 no.2:97-112 1954.

1. Z Instytutu Farmaceutycznego. Dyrektor: mgr W. Gumilka.
(DEXTRAN,
*pharmacol. & prep.)

SYNOWIEDZKI, L

SYNOWIEDZKI, Z.; KOJER, R.; KROWCZYNSKI, L.; WAGNER, R.; GRUBER, X.;
TRALO, R.

Stability of hemopoietic factors in concentrated liver extracts.
Acta Poloniae pharm. 11.no.2:137-145 1954.

1. Z Instytutu Farmaceutycznego w Warszawie. Dyrektor: mgr W.Gamulka.
(LIVER EXTRACTS,

*stability of hemopoietic factors in)

SYNOIEDZKI, Z.

Blood-forming drug produced from liver. p. 165.
CHEM, Katowice, Vol. 8, no. 6, June 1955.

SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 4, no. 10, Oct. 1955,
Uncl.

SYNOWIEDZKI, Zdz. Doc. Mgr.; PIASKOWSKI, St. Mgr.

Crystalline penicillin tablets for oral administration. Farm.
polska 11 no.1:7-10 Jan '55.

1. Z Zakladu Farmacji Stosowanej Instytutu Farmaceutycznego w
Warszawie.

(PENICILLIN, administration,
oral, crystalline penicillin tablets)

SYNOWIEDZKI-Z

Utilization of bird excrements for obtaining purine alkalo-
 loids. B. Bobrański and Z. Synowiedzki (Med. Acad.,
 Wrocław, Poland). *Acta Polon. Pharm.* 11, 41-4 (1955)
 (English summary).—A method of prepn. of uric acid by
 extn. of bird excrements was developed, which gives at
 least 3.2% yield. Thus, dried chicken excrements (1 g.
 contg. sand, feathers, etc.) were boiled with 5 l. H₂O and 200
 ml. HCl for 1 hr., 70 g. NaOH was added and heating con-
 tinued for 1/2 hr. Slaked lime (50 g.) was added and heating
 was continued for 1 1/2 hrs. The filtered residue was digested
 with 3 l. H₂O contg. 10 g. NaOH, filtered, and 32 g. uric
 acid was pptd. from the combined ext. with HCl. The
 crude acid was dissolved in Na₂CO₃ soln., treated with active
 charcoal, and pptd. with HCl. A. Shadan

Mark 2

SYNOWIEDZKI, Z.

V
CH 832* Prospects of Utilizing Russia's Experience in the Production and Science of Antibiotics in Poland. Perspektywa wykorzystania w Polsce doświadczeń produkcji i nauki radzieckiej w dziedzinie antybiotyków. (Polish.) Z. Synowiedzki. Przemysł chemiczny, v. 11, no. 10, Oct. 1953, p. 535-560.
Outline of the administrative and scientific organizations in this field, and the range of research and production covered.

SYNOWIEDZKI, Z.

✓4487

615,779,932 : 661,183.2

Synowiedzki Z., Plebański T. A Study of the Application of Activated Carbon „Carbopol” for Separation of Impurities in the Process of Preparation of Crystalline Penicillin.

„Badania nad zastosowaniem węgla aktywnych „Carbopol” do oddzielania zanieczyszczeń w procesie otrzymywania krystalicznej penicyliny”. Przemysł Chemiczny. No. 5, 1956, pp. 281—286, 5 figs., 7 tabs.

Conditions are given for purifying penicillin by using activated carbon „Carbopol”. Seventeen carbons were investigated and it was found that the best results in purifying penicillin were obtained with „Carbopol N-2” (acid carbon with high adsorption properties) at pH = 5.5. The most suitable extracts for isolating pigments and other impurities were those of 1.360 — 6.360 mg/ml of solution.

Med

2

POLAND/Acoustics - Ultrasonics

J-4

Abs Jour : Ref Zhur - Fizika, No 4, 1959, No 6588

Author : Synowiedzki Z., Topa M., Boldok Cz., Jankowska J.

Inst : -

Title : The Application of Ultrasonics to the Biological Research
on Obtaining Highly Effective Strains for the Antibiotics
Production

Orig Pub : Proc. II conf. ultrason., 1956. Warszawa, PWN, 1957, 219-222

Abstract : Experiments on the effective ultrasonics on microorganisms have shown that this action is not limited only to destructive effects, but also causes intracellular changes, connected with the physiology and morphology of the microorganisms. An investigation was made of the effects of ultrasonics on streptomyces griseus spores for the production of streptomycin. The action was realized in an aqueous medium with variation in the irradiation parameters, after which the spores were grown on a solid medium, parallel with the unsounded microorganisms. The time of irradiation was 5, 60, 300, 480 and 600 sec.

Card : 1/2

SYNOWIEDZKI, Z.

"The need of developing some branches of the pharmaceutical industry."

p. 33 (Chemik) Vol. 10, no. 2, Feb. 1957
Warsaw, Poland

SO: Monthly Index of East European Accessions (EEAI) LC. Vol. 7, no. 4,
April 1958

SYNTEYA, N. D.

USSR

Modification of cast high-alloy steels. N. D. SynteYA and V. T. Svirshchanko (Dokl. Akad. Nauk USSR, 1954, 89, 118-120).
0.015-0.02% of H causes a maximum increase (of 100%) in the durability of steel knives, containing ~1% C, ~4.5% Cr, 13-16% W, and ~1.53% V, due to an increase in the content, and change in the composition, of carbides, and an impoverishment of the γ -solid solution in W.

R. C. MURRAY.

L 35957-66 EMT(1)

ACC NR: AP6027355

SOURCE CODE: UR/0102/66/000/002/0076/0081

AUTHOR: Rakov, M. A. (L'vov); Synyts'kyi, L. A.--Sinit'skiy, L. A. (L'vov);
Shumkov, Yu. M. (L'vov)

7/
B

ORG: none

TITLE: Operation of a synchronous detector in multistable elements of automatic systems

SOURCE: Avtomatyka, no. 2, 1966, 76-81

TOPIC TAGS: automatic control system, detection equipment, semiconductor device, harmonic analysis

ABSTRACT: The article deals with the properties of a synchronous detector of the semiconductor triode type, which are of interest in connection with the problem of constructing automatic-system elements with many stable states. The performance of this detector in the presence of a square shaped input signal is examined for the case of higher harmonics and subharmonics and various types of generators. The degree of the suppression of undesirable harmonics, leading to the possibility of misleading operation of the element, is considered. Simple working formulas, which proved to be in satisfactory agreement with the experimental findings on the development of an element with 10 stable states, are presented. Orig. art. has: 2 figures and 12 formulas. [JPRS: 36,517]

SUB CODE: 09 / SUBM DATE: 18Mar65 / ORIG REF: 002 / OTH REF: 001

Card 1/1 *ms*

0917

0421

SYNZYNYS, B.

Bee Culture - Moscow (Province)

Increase the honey comb store of the bee colony. Pchelovodstvo 29 no.3:21-23 Mr '52.

9. Monthly List of Russian Accessions, Library of Congress, July 195~~8~~² Uncl.

1. SYNZYNTS, B.Z.
2. USSR (600)
4. Bee Culture
7. Bee culture in the area of the great construction projects of communism.
Pchelovodstvo 29. no. 11. 1952.

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Unclassified.

SYNZYNIS, B.

Bee Culture

Planning beekeeping on the collective farm. Pchelovodstvo 30, No. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, June 1953, Uncl.

SYNZYNYS, B.Z., kandidat ekonomicheskikh nauk.

Combination tractor groups. Nauka i pered. op. v sel'khoz.
no.10:49-51 O '56. (MLRA 9:12)

(Collective farms) (Machine-tractor stations)

²
SYNZYNYS, B.: SAMEDOV, S.

"Analysis of the economic aspects of state farms" by S.I. Nedelin.
Reviewed by B. Synzynys, S. Samedov. Bukhg. uchet. 15 no.11:
56-60 N '56. (MLRA 9:12)

(State farms--Accounting) (Nedelin, S.I.)

SYNZYNYYS, B.Z., kandidat ekonomicheskikh nauk.

Hundred centners of pork per hundred hectares of plowland.
Nauka i pered.op.v sel'khoz. 7 no.6:13-14 Je '57. (MLRA 10:7)
(Swine)

3-1-57
MIKHAYLOV, M.V.; SYNZYNS, B.Z., kand. ekon. nauk.

Economic accountability within brigades and livestock sections of collective farms. Nauka i pered. op. v sel'khoz. 7 no.12:47-49 D '57. (MIRA 11:1)

1. Sekretar' Pyatigorskogo glavnogo komandovaniya Kommunisticheskoy partii Sovetskogo Soyuza (for Mikhaylov).
(Collective farms---Accounting)

BAYEV, A.; SYNZYNYYS, B. 2

Efficient farm size and utilization of labor resources. Vop. ekon.
no.3:111-119 Mr '60. (MIRA 13:2)
(Khomutovka District--Collective farms)

SYPCHENKO, G.I., dotsent, kandidat tekhnicheskikh nauk.

Theory of automatic variable-speed drives operated by the
utilization of centrifugal forces of inertia. Nauch.trudy
NPI 30(44):83-93 '55. (MLRA 9:11)
(Gearing) (Moments of inertia)

SYPOCHENKO, G.I. [Sypchenko, H.I.]; MAL'TSEV, N.N. [Mal'tsev, N.M.];
TKACHUK, V.P.; KOVAL'CHUK, D.S.; HAYVEL'T, V.M.

Application of various methods for measuring acetaldehyde concentration in water solutions. Khim. prom,[Ukr.] no.1:54-66
Ja-Mr '65. (MIRA 18:4)

Supplement I, II

AL'TSHULER, Z.Ye., inzh.; BASTUNSKIY, M.A., inzh.; BERSTEL', V.N., inzh.;
BIRNBERG, I.E., inzh.; BOGOPOLSKIY, B.Kh., inzh.; BUKHARIN, S.I.,
inzh.; GERSHTEYN, B.G., inzh.; GRINSHPUN, L.V., inzh.; DREYER, G.I.,
inzh.; DINERSHTEYN, A.G., inzh.; ZLATOPOL'SKIY, D.S., inzh.; KLANYUK,
A.V., inzh.; KOZIN, Yu.V., inzh.; LEVITIN, I.P., inzh.; MEL'NIKOV,
L.F., inzh.; MEL'KUMOV, L.G., inzh.; NADEL', M.B., inzh.; PAVLOV,
N.A., inzh.; PASLEN, D.A., inzh.; PESIN, B.Ya., inzh.; PYATKOVSKIY,
P.I., inzh.; RAZNOSCHIKOV, D.V., inzh.; ROZENoyer, G.Ya., inzh.;
ROZENBERG, R.L., inzh.; ROYTENBERG, N.L., inzh.; RYABINSKIY, Ya.I.,
inzh.; SYCHENKO, I.I., inzh.; TABACHNIKOV, L.D., inzh.; FEL'DMAN,
E.S., inzh.; SHTRAKHMAN, G.Ya., inzh.; SHTERENGAS, N.S., inzh.;
LEVITIN, I.P., otvetstvennyy red.; STEL'MAKH, A.N., red.izd-va;
BEKKER, O.G., tekhn.red.

[Overall mechanization and automatization of production processes in
the coal industry] Kompleksnaya mekhanizatsiya i avtomatizatsiya
proizvodstvennykh protsessov v ugol'noi promyshlennosti. Pod red.
IU.V.Kozina i dr. Moskva, Ugletekhizdat, 1957. 82 p. (MIRA 11:3)

1. Gosudarstvennyy proyektno-konstruktorskiy institut. 2. Institut
Giprougleavtomatizatsiya i Tekhnicheskogo Upravleniya Ministerstva
ugol'noy promyshlennosti (for all except: Levitin, Stel'makh,
Bekker)

(Automatic control) (Coal mining machinery)

SYRCHENKO, O.A.

BLOKH, R.L.; NAZAROVA, S.A.; SYPCHENKO, O.A.; YEREMEYEV, Yu.N.; YAKSANOVA, A.M.; RUBINSKIY, S.I.

Outdoor day naps during the cold season in the treatment of night sleep disorders. Vop.kur., fizioter. i lech.fiz.kul't. 22 no.3: 17-21 My-Je '57. (MIRA 11:1)

1. Iz Pyatigorskogo klinicheskogo otdeleniya (zav. - prof. Ye.Ya. Stavskaya) Bal'neologicheskogo instituta na Kavkazskikh Mineral'nykh Vodakh (dir. - dotsent I.S.Savoshchenko) i klinicheskogo sanatoriya Pyatigorskogo kurorta (glavnyy vrach O.N.Smolenskaya)
(INSOMNIA) (SLEEP)

SYCHUK, P. F.

IVASHCHENKO, I. P. Arkh. i SYCHUK, P. F. Inzh., Pilyugin, A. I. Kand. Tekhn. Nauk,
MONFRED, YU. B., IVANOV, I. T. Kand. Tekhn. Nauk

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